

PDA DETERMINED SODIUM AND POTASSIUM BICARBONATE PARTICLE PROPERTIES IN COUNTERFLOW DIFFUSION FLAMES

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The search for more effective halon replacement agents and alternative fire suppression technologies includes investigations into the suppression properties of aerosols. We recently reported on our investigations of the extinction properties of bicarbonate powders in counterflowing diffusion propane/air flames [1]. This poster extends those studies, examining the size and velocity distributions of the particles actually delivered to the flames, as well as a determination of the fate of the particles at various strain rates. Powders examined in the current study include potassium bicarbonate (KHCO_3) and sodium bicarbonate (NaHCO_3) sieved into various size groupings from 38 to 75 μm . A phase Doppler anemometry (PDA) system was used to measure particle velocity, size, and concentration. Particles with sizes that lead to greater residence times near the intersection of the counterflowing fields show a higher suppression effectiveness.

[1] "Behavior of Bicarbonate Powders in Counterflow Diffusion Flames", M.D. Reed, B. W. Williams, R.S. Sheinson, and J.W. Fleming, Proceedings of the Meeting of the Eastern States Section: The Combustion Institute, 83-86 (1997).

Supported in part by SERDP Next Generation Fire Suppression Technology Program and by the U.S. Naval Sea Systems Command.

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